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AUTHOR Bolge, Robert D.
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ABSTRACT

A study was conducted at Mercer County Community College in Trenton, New Jersey, to determine whether there was any significant difference in the amount of learning attained by students who received instruction from full-time and part-time faculty members. Two independent samples of 50 students each were randomly drawn from the population of 637 students enrolled in Basic Mathematics course sections in fall 1994. Group I was taught by full-time faculty, and group II was taught by part-time faculty. All sections and students in the sections were given number designations. Based on students' pre- and post-test scores on the mathematics subtest of the New Jersey College Basic Skills Placement Test (NJCBSTPC), the study found no significant difference between the amount of learning of students taught by full-time and part-time faculty. Group I had a mean posttest score on the NJCBSTPC of 177.8400, with a standard deviation of 4.186, while group II had a mean score of 177.9800, with a standard deviation of 3.514. (Contains 44 references.) (KP)

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JC 950 212

EXAMINATION OF STUDENT LEARNING AS A FUNCTION OF INSTRUCTOR STATUS (FULL-TIME VERSUS PART-TIME) AT MERCER COUNTY COMMUNITY COLLEGE

by

Robert D. Bolge

March, 1995

Abstract

The problem under investigation was the growing use of part-time faculty in higher education. The purpose of the study was to determine whether there was any significant difference in the amount of learning attained by students receiving instruction from full-time faculty and by students receiving instruction from part-time faculty.

A literature review uncovered a shared concern about the increasing use of part-time faculties and a sizeable collection of developmental programs aimed at increasing the teaching effectiveness of part-time faculties. There was little research available on the effectiveness of part-time faculty. Only one research study was found which compared the teaching effectiveness of full-time faculty and part-time faculty.

The study was guided by the following hypothesis: For remedial students taking Basic Mathematics, the amount of learning attained will be significantly higher for students instructed by full-time faculty than for students instructed by part-time faculty as determined by the mean difference in post-test scores between two independent samples using the t-test at a .05 level of significance. The samples consisted of 50 students each, randomly selected.

Test results showed no significant mean difference between the post-test scores of the two samples. The conclusion was that students taught by full-time faculty fared no better in post-test scores (final grades) than students taught by part-time faculty.

Recommendations for MCCC included dissemination of the study to all faculty and continuing the practice of employing part-time faculty. General recommendations suggested more research on part-time faculties and the use of the methodology developed for this study at other colleges.

INTRODUCTION

Nature of the Problem

A prominent issue in higher education continues to be the use of part-time faculty. More and more colleges and universities are using part-time faculty to balance constrained budgets. According to the American Council on Education (1988), part-time faculty in the national community college sector showed a 47% growth rate as compared to a 26% growth rate for full-time faculty from 1976 to 1986 (p. 38). The Chronicle of Higher Education (1993) puts the percentage of part-time faculty in the national community college sector at 59% and the percentage of regular full-time faculty at 41% (p. 63).

Using part-time faculty members in times of high enrollment in specific courses or during periods of financial exigency makes good administrative sense. However, does this solution make good educational sense? Are part-time faculty members as qualified as full-time faculty members? Do they have the same commitment to students? Are institutions which rely on part-time faculty members providing these professionals with adequate supports?

These questions speak to a dramatic change that is taking place in higher education. That change is a growing demand from the public and government for accountability in higher education. The key issue in this change and ongoing debate is student success.

Purpose

The purpose of this study was to determine whether there is any significant difference in the amount of learning attained by students who receive instruction from full-time faculty members and by students who receive instruction from part-time faculty members. The "amount of learning attained" by a student or "amount of student learning" was defined as the post-test scores achieved by the students in each independent sample: those students instructed by full-time faculty members (sample 1) and those students instructed by part-time faculty members (sample 2).

Significance to the College

Mercer County Community College (MCCC) is an open access, coeducational, public, two-year college. Its credit student enrollment averages 12,000 annually with 3,500 full-time students and 8,500 part-time students. Over 50% of the full-time students and 35% of the part-time students require one or more developmental courses to build academic skills in reading, writing, and/or mathematics.

MCCC has used part-time faculty extensively for evening and overflow daytime classes throughout its twenty-seven year history. Over the last eight years, the use of part-time faculty has increased to meet budget shortfalls, especially in the developmental area where enrollment has increased.

In this situation, it becomes important to examine the impact on student learning by using part-time faculty members. If the amount of learning attained by students who are taught by part-time faculty members falls significantly below the amount of learning attained by students who are taught by full-time faculty members, MCCC will have to take action to increase the learning of students who are taught by part-time faculty members. It is very important that developmental students are successful. Unsuccessful students can become permanent dropouts. Successful students increase enrollment through returning to complete degree and certificate programs. Since MCCC has become a tuition-driven college, returning students are a very important resource which needs to be fully cultivated.

Research Question and Hypothesis

The following research question was chosen to guide this study: Do students learn less when they are taught by part-time faculty members as compared to full-time faculty members? The research hypothesis was as follows: For remedial students taking Basic Mathematics (MS100), the amount of learning attained will be significantly higher for students who are instructed by full-time faculty members than for students who are instructed by part-time faculty members as determined by the mean difference of post-test scores between two, independent samples using the t-test at a .05 level of significance. The research hypothesis assumed that there was no significant mean difference in pretest scores between the two, independent samples.

REVIEW OF LITERATURE

The body of literature on the use of part-time faculty members in higher education can be divided into three conceptual categories: (a) attitudes toward and treatment of part-time faculty, (b) attitudes of part-time faculty, and (c) teaching effectiveness of part-time faculty (Gappa & Leslie, 1993). These categories are well expressed in the issues questions posed by W. Deegan, D. Tillery, and Associates in Renewing the American Community College (1989):

> This state of affairs suggests an urgency for quantitative and qualitative analysis of the use use of part-time faculty in community colleges. This analysis needs to focus on several central questions: (1) How are part-time faculty used in community colleges? ... (3) What are the major factors that currently determine the extent to which part-time faculty are used in credit course instruction? ... (4) What is the impact of using large numbers of part-time faculty on the institution? On the full-time faculty? On the students? (5) To what extent do programs for the integration and development of part-time faculty exist in community colleges, and what is the nature of these programs? (p. 313)

Attitudes Toward and Treatment of Part-Time Faculty

Administrative attitudes toward part-time faculty have been very positive because their use permits colleges and universities with a low-cost way to provide more classes for high-interest courses, to offer special courses and programs using in-the-field experts, and to maintain full course schedules during periods of financial exigency (Cohen & Brawer, 1989). These attitudes and the accompanying increased use of part-time faculty have been more prevalent in the community college movement than in any other sector of higher education (Vaughan, 1994) In the last decade, however, these attitudes and the practices derived from them are becoming more popular in the other sectors of higher education (AAUP, 1993; Seal & Jemmott, 1994).

Administrative treatment of part-time faculty has been less than admirable (Council of the American Mathematical Society, 1994). Historically, part-time faculty have had

few rights and privileges (American Anthropological Association, 1993).

Full-time faculty have had conflicting attitudes toward part-time faculty (Fonseca, 1984). On the negative side, part-time faculty are considered an administrative device to limit full-time faculty positions (Gappa & Leslie, 1993; Warner, 1992). The uncontrolled use of part-time faculty is considered a threat to the professionalism of full-time faculty (Kekke, 1983; Moehs, 1992).

According to Clark (1988) "Nothing deprofessionalizes an occupation faster and more thoroughly than the transformation of full-time posts into part-time labor" (p. 9). Also, the excessive use of part-time faculty is viewed as detrimental to the academic excellence of a program, department, division, or college itself (Warner, 1992).

On the positive side, full-time faculty are accepting part-time faculty members as peers with respect to credentials and professionalism (Association of Departments of English, 1994). Sympathetic full-time faculty are pushing their institutions to provide part-time faculty with rights, privileges, and status within the academic community through the auspices of the National Education Association (NEA), American Association of University Professors (AAUP), and academic associations (NEA, 1989). The documents which these organizations are producing press for limited use of part-time faculty, and the proper accommodation and acceptance of working part-time faculty in the name of academic excellence (AAUP, 1992; NEA, 1987; New York State TESOL, 1994).

Attitudes of Part-Time Faculty

Part-time faculty members consider themselves to be as professional as full-time faculty (Thompson, 1994). They, therefore, have three concerns. First, they are not paid enough for their services (Pollington, 1992). Second, they want the same rights and privileges which full-time faculty have as employees of the college (Cohen, 1992; Nist, 1987; Warner, 1992). Third, part-time faculty want to be accepted into the college community as equal partners in the educational enterprise (Kekke, 1983; Moehs, 1992).

Part-time faculty within specific universities and colleges have formed negotiating units(Halpern, 1994). Rutgers University and Rider University are institutions

which now negotiate a part-time faculty contract. Such faculty contracts address salary, fringe benefits, rights, and privileges accorded to part-time faculty as well as employment responsibilities (Thompson, 1994). MCCC and other progressive community colleges are providing part-time faculty with a defined institutional role through part-time faculty handbooks and academic division procedures relating to office space, access to facilities, participation in governance activities, and access to development opportunities (Cohen 1992; MCCC, 1994).

Traditionally, the part-time faculty ranks have been filled mostly by "moonlighters" who have full-time employment outside the colleges in which they taught (Cohen & Brawer, 1989; Gappa & Leslie, 1993). In the 1990's, the part-time faculty population has changed through the entrance of members who do not have full-time outside employment (Marcus, 1994). These newcomers are accepting part-time positions as their primary employment (Thompson, 1994). Their goal is to acquire full-time faculty positions (AAUP, 1993). Such new part-time faculty are demanding to be accepted as professional equals of full-time faculty (Cohen, 1992; Moehs, 1992; Pollington, 1992; Rio Salado Community College, 1990).

Teaching Effectiveness of Part-time Faculty

A major issue in the debate over using part-time faculty is teaching effectiveness and student success. Are part-time faculty as competent in teaching skills as are the full-time faculty (Nist, 1987)? The community college movement has been the most active sector in higher education on the issue of teaching effectiveness (Cohen & Brawer, 1989). The model established by the community college movement is based on hiring faculty by academic credential(s) and, then, providing teaching effectiveness training as a professional development responsibility of the institution toward its employees (Greive & France, 1992; Rio Salado Community College, 1990).

A good example of this model is MCCC. The college established an Instructional Theory Into Practice (ITIP) program (MCCC, 1987). Full-time faculty were required to participate in the program, and part-time faculty were given the opportunity to join them (MCCC, 1989). After the full-time faculty members completed the program, the remaining part-time faculty members were required to complete the program (MCCC, 1992a). Now that the college has few, new

full-time and part-time faculty joining the institution, the program has been reduced into an Instructional Effectiveness Guide (MCCC, 1992b). New faculty members are given a copy of the guide and assigned a mentoring faculty member who acts as a resource peer (MCCC, 1994).

Other colleges have similar programs (APAF, 1992;. Gerda, 1991; Ostertag, 1991). Programs, ranging from workshops, to mentoring by full-time faulty members, to an associate degree, have been established for the training of part-time faculty at many institutions (Gerda, 1991). In some states, as in New Jersey, consortiums on teaching effectiveness exist as do special college and university institutes for the training of full-time and part-time faculty members (Finkelstein, 1994; Krukovsky, 1994; Ravitz & Stevens, 1994).

The National Education Association offers part-time faculty a pamphlet on responsibilities (NEA, 1989). Private enterprise guides are available, also (Greive, 1993 & 1994).

The evaluation of part-time faculty most often takes the form of in-class observations (Gappa & Leslie, 1993). Most of these evaluations focus on the learning process and on assisting part-time faculty members with the introduction of techniques to increase the effectiveness of the learning process (Finkelstein, 1994). As such, these evaluations are process orientated, not outcome orientated (Gappa & Leslie, 1993).

Although Cohen and Brawer (1989) in their second edition of The American Community College called for outcome studies measuring the effectiveness of part-time faculty against the effectiveness of full-time faculty, very little has been published on the subject (p. 76). Many of the published studies on part-time faculty focus on their growing numbers in higher education (American Council on Education, 1988; Chronicle of Higher Education, 1993; Cohen & Brawer, 1989). The 1993 National Study of Postsecondary Faculty found that "53.4% of public two-year college faculty teach part time" (ERIC, 1994, p. 1).

A search of UNCOVER index (on Internet) from July, 1979 through October, 1994 turned up no research on the teaching effectiveness of part-time faculty in such prestigious journals as the American Educational Research Journal and Review of Educational Research. A search of ERIC from 1990 through 1994 found two articles which addressed the teaching effectiveness of adjuncts in terms of student success.

The Fullerton College study investigated the classroom results of training part-time faculty in new teaching techniques (Kelly, 1992). The results were high student and teacher satisfaction with the learning process; however, no significant increase in student retention occurred (Kelly, 1992).

The College of the Canyons study explored the effects of participation in the Associate Program for Adjunct Faculty (APAF) conducted at the college (Mattice & Richardson, 1993). The study found very little difference in teaching-learning processes and classroom behavior between part-time faculty who participated in the APAF and the part-time faculty who did not participate (Mattice & Richardson, 1993).

Only one study which compared the outcome effectiveness of part-time faculty and full-time faculty in terms of student success was found in a specialty journal Adjunct Info: A Journal for Managers of Adjunct and Part-Time Faculty, (Stovall, 1994). In the Valencia Community College study conducted by R. Stovall (1994), "there was no relationship [found] between student performance in classes taught by adjuncts versus full-time faculty" using grade distribution as the measure of performance (p. 1).

Summary

A search of the literature on part-time faculty has uncovered an extensive debate. Most of the material is attitudinal and qualitative. In the main, it consists of position papers, guidelines, statements of concern, and training programs and materials to improve teaching effectiveness.

Of the research studies on part-time faculty which are available, most are focused on the growing utilization of part-time faculty within higher education and the comparison of part-time faculty and full-time faculty profiles. There are few studies which evaluate the teaching effectiveness of part-time faculty. Of the three studies found on the teaching effectiveness of part-time faculty, only one study compared part-time faculty and full-time faculty using student performance. This study found no significant difference in teaching effectiveness between part-time faculty and full-time faculty.

DATA COLLECTION

Sample

Two independent samples of fifty students each were randomly drawn from the population of students who enrolled in the Basic Mathematics (MS-100) course sections for the 1994 fall semester. The population numbered 637 students: 396 students enrolled in course sections taught by full-time faculty and 241 students enrolled in course sections taught by part-time faculty. The sample selection procedure was as follows.

Phase 1. All course sections taught by full-time faculty were separated into two groups, day sections and evening sections. Each section was assigned a number. Using the number designations, two day sections and two evening sections were randomly drawn from each pool. The same procedure was followed to select four sections taught by part-time faculty.

Phase 2. All students in the sample sections were given number designations. Using the sample sections taught by full-time faculty, twenty-five students with pretest and post-test scores were randomly drawn from the sample day sections, and twenty-five students with pretest and post-test scores were randomly drawn from the sample evening sections. The same procedure was followed to draw a fifty-student sample from the sample sections taught by part-time faculty. The total sample size for the study was 100 students.

Instrument

The instrument used in the study is the mathematics subtest of New Jersey College Basic Skills Placement Test (NJCBSPT). The State of New Jersey provides public colleges with several variations of each subtest within the NJCBSPT for the purpose of post-testing students who are required to complete developmental course work. These variation subtests have been constructed, normed, and validated by the Educational Testing Service of the College Board. All variations of the NJCBSPT mathematics subtest contain the same number of problems and are comparably scored.

Treatment of Experimental Groups

This research is designed with two experimental groups. There is no control group. Experimental Group I (Sample 1) consisted of fifty students who were taught by full-time faculty. Experimental Group II (Sample 2) consisted of fifty students who were taught by part-time faculty.

Students in both groups completed a pretest prior to enrollment in an MS-100 course section and completed a post-test at the end of a fifteen-week semester in the MS-100 course. All tests (pretests and post-tests) were conducted by Academic Testing Center of the college under strict security procedures.

The only difference in treatment between the two experimental groups was type of instructor. Students in Experimental Group I received fifteen weeks of instruction by full-time faculty. Students in Experimental Group II received fifteen weeks of instruction by part-time faculty.

Data Presentation

The post-test scores of students are presented in the RESULTS section of this report by experimental group. For each experimental group the following descriptive statistics are presented: number of cases, mean score, standard deviation, and standard error. Inferential test results include F-test value with two-tailed probability, t-test pooled variance estimate with t-value, degrees of freedom and two-tailed probability, and t-test separate variance estimate with t-value, degrees of freedom, and two-tailed probability.

DATA ANALYSIS

Null Hypothesis

The null hypothesis for this study was as follows. For remedial students taking Basic Mathematics (MS100), there is no significant difference between the amount of learning attained for students who are instructed by full-time faculty and for students who are instructed by part-time faculty as determined by the mean difference in post-test scores between two independent samples using the t-test at a .05 level of significance.

Alternate Hypotheses

If the results of the t-test are sufficient to reject the null hypothesis, then two possibilities exist. There may be sufficient evidence to accept the research hypothesis. The research hypothesis is as follows. For remedial students taking Basic Mathematics (MS100), the amount of learning attained will be significantly higher for students who are instructed by full-time faculty than for students who are instructed by part-time faculty as determined by the mean difference in post-test scores between two independent samples using the t-test at a .05 level of significance.

Or, there may be sufficient evidence to support an alternate hypothesis which is contrary to the research hypothesis. The contrary alternative hypothesis is as follows. For remedial students taking Basic Mathematics (MS100), the amount of learning attained will be significantly higher for students who are instructed by part-time faculty than for students who are instructed by full-time faculty as determined by the mean difference in post-test scores between two independent samples using the t-test at a .05 level of significance.

Level of Significance

A .05 level of significance was selected to limit the possibility of Type I error. A smaller alpha is not required because the sample size (n = 100) is sufficient to keep the possibility of Type I error at an acceptable level.

Further, the purpose of the study was to find any significant difference in student learning outcome which may be attributed to teacher status (full-time faculty member or part-time faculty member). In such exploratory research, a .05 level of significance is sufficient to keep the possibility of Type II error at an acceptable level as both types of errors are inversely related. Also, the sample size used in the study was sufficient to limit further the possibility of Type II error.

Region of Rejection

The region of rejection selected for this research was +.025 and -.025. This made the test of the null hypothesis

a two-tailed test at a .05 level of significance. The research hypothesis was stated in terms of a positive one-tailed test. Therefore, some explanation is needed.

As it was written, the research hypothesis addressed the current higher-education belief that full-time faculty are better and more committed teachers of students than are part-time faculty. The contrary alternative hypothesis, while it goes against current belief, was just as important to test. Therefore, a true test of the null hypothesis had to be a two-tailed test.

In traditional statistical terms, the research hypothesis and contrary alternative hypothesis can be stated as a single, alternative hypothesis to the null hypothesis. Such an alternative hypothesis would be stated as follows. For remedial students taking Basic Mathematics (MS100), there is a significant difference between the amount of learning attained for students who are instructed by full-time faculty and for students who are instructed by part-time faculty as determined by the mean difference in post-test scores between two independent samples using the t-test at a .05 level of significance.

In general, the power of an inferential test is weaker for two-tailed (two-sided) analysis than for one-tailed (one-sided) analysis. However, since the power of a test is assessed in terms of beta or Type II error, sample size can give more power to a two-tailed analysis. In this research, the sample (n = 100) was of sufficient size to offset the weakness inherent in a two-tailed analysis.

Statistical Test

The statistical test selected for the research was the t-test. Under certain conditions, the t-test is a powerfully robust test. These conditions have been met by the research design and nature of the data. In summary, the two independent samples were selected randomly. The dependent variable values (test scores) were measurable by the ratio scale. The means of the two independent samples were linear combinations of test scores. There were, however, two issues which needed to be resolved to ensure that the t-test results of this study were not compromised.

Equal Variances Requirement

T-testing requires that both samples have equal variances. There are three ways to deal with this issue: (a) assume equality of variances, (b) apply an F-test to the data, and (c) calculate the t-test using the separate variance estimate procedure. The first choice was unacceptable because it put the result of the study into question. Using the F-test is an acceptable check for equal variances for most social and educational researchers although statisticians do not find it acceptable.

Two procedures have been established for conducting the t-test. The first procedure is called a pooled variance estimate and assumes equal variance in the independent samples. The second procedure is called a separate variance estimate and provides a mathematical correction for the possibility of unequal sample variances. The separate variance estimate procedure requires some very difficult calculations which have limited its use by non-statisticians. However, with SPSSx software, the computer does all the difficult work.

For this study, the t-test of data was run by the pooled variance estimate procedure and the separate variance estimate procedure. Additionally, the F-test was used.

Equal Ability of Samples

To determined the mean difference in post-test scores between the two independent samples using the t-test, the two samples have to show no significant mean difference in pretest scores. Put another way, there has to be evidence that each independent sample of students has equal ability.

A t-test analysis of the mean difference in pretest scores between the two independent samples was conducted. There was no significant difference found between the two independent samples at a .05 level using a two-tailed test. This evidence suggested that the two independent samples had equal ability. See the Appendix for supporting statistics.

DEFINITION OF TERMS

A full-time faculty member is a teaching professional who is employed full-time by the college and holds academic

rank. (S)He may or may not be tenured.

A part-time faculty member is a teaching professional who is employed to teach between one and three course sections on a semester-by-semester basis. (S)He does not work for the college in any full-time or permanent part-time capacity.

A pretest score is a measure of a student's mathematical knowledge before treatment. A post-test score is the amount of learning attained by a student or, simply, the amount of student learning after fifteen weeks of instruction in an MS-100 course section.

ASSUMPTIONS AND LIMITATIONS

The research was designed and executed to control extraneous variables which could compromise the data and results. The sample selection procedure randomized the effects of personal characteristics of specific faculty members and addressed possible differences between day and evening students. The use of NJCBSPT mathematics subtests for comparable pretest and post-test instruments eliminated any bias which may have been present in a locally-developed instrument(s). The operational definition of student learning as a student's post-test score sufficiently objectified the dependent variable and was sensitive enough to detect learning which had taken place even though a student may not have passed the course.

The use of developmental mathematics students as the subjects of the study controlled the effect of "self-learning." Developmental students tend not to be self-learners; their past histories of lack of learning success demonstrate the need for instructional help.

The study has two limitations. First, its sample was drawn from only one college. Second, there is a possibility that its results may not be generalizable beyond developmental (remedial) courses. Even with these limitations, the results of the study provide valuable information and may give other researchers insights into how they may address the same issue -- the effect of part-time faculty instruction on student learning -- at their colleges and universities.

RESULTS

The post-test scores of the students are listed below. Experimental Group I (Sample 1) scores appear in Table 1. Experimental Group II (Sample 2) scores appear in Table 2.

Table 1: Post-test Scores for Experimental Group I (Sample 1: Students Taught By Full-Time Faculty, S1n = 50)

Score	Score	Score	Score	Score
180	170	171	180	180
180	174	179	172	180
168	180	180	179	160
179	174	174	180	180
180	180	180	180	180
170	180	180	174	180
180	180	180	178	180
180	174	180	180	180
180	180	180	180	180
180	180	176	180	180

Table 2: Post-test Scores for Experimental Group II (Sample 2: Students Taught By Part-Time Faculty, S2n = 50)

Score	Score	Score	Score	Score
180	178	170	167	180
180	180	180	180	176
178	180	180	168	180
180	180	180	180	180
176	180	176	180	178
175	178	171	180	179
170	176	179	180	179
180	179	180	178	180
180	170	179	180	180
180	179	180	180	180

For Experimental Group I the mean was 177.8400 with a standard deviation of 4.186. The standard error was 0.592.

For Experimental Group II the mean was 177.9800 with a standard deviation of 3.514. The standard error was 0.497.

An F-test of the data showed no significant difference in the variances of the two groups at a .05 level. The F-test value was 1.42 with a two-tailed probability of 0.224.

Under the pooled variance estimate procedure for the t-test, the t-value was -0.18 at 98 degrees of freedom. The two-tailed probability was 0.857.

Under the separate variance estimate procedure for the t-test, the t-value was -0.18 at 95.14 degrees of freedom. The two-tailed probability was 0.857.

For the mean difference of the post-test scores between the two experimental groups to be significant at a .05 level, the two-tailed probability must be equal to or less than .050. In both t-test procedures, the two-tailed probability exceeded .05.

DISCUSSION

As shown above, there is insufficient evidence to reject the null hypothesis at a .05 level of significance. Neither alternative hypothesis -- the research hypothesis and its contrary hypothesis -- was supported by the results of the t-test procedures.

In inferential research, two questions always arise. First, "Was the possibility of a Type II error adequately addressed?" The answer is yes. The sample size (n = 100) was large enough to reduce sufficiently the possibility of a Type II error while using an alpha of .05.

Second, "Did the two independent samples have equal variances?" An assumption of equal variance can produce flawed results. To control for this, an F-test (analysis of variance) was run, and both t-test procedures were used. The F-test results confirmed equal variances in the samples. Further, the two t-test procedures showed the same results: a t-value of -0.18 and a two-tailed probability of 0.857. The pooled variance estimate procedure assumes equal

variances. The separate valiance estimate procedure does not assume equal variances. The two independent samples used in the study did have equal variances.

A search of the available literature on part-time faculty found one inferential study which compared the effectiveness of full-time faculty and part-time faculty using student grade distribution (Stovall, 1994). Stovall's results were the same as those of the current research. Both studies found no significant difference in performance between students taught by full-time faculty and students taught by part-time faculty.

CONCLUSIONS

The purpose of this study was to determine whether there was any significant difference in the amount of learning attained by students who received instruction from full-time faculty in comparison with students who received instruction from part-time faculty. The conclusion is that no significant difference was found. Students who had full-time faculty members as instructors fared no better in post-test scores (final grades) than did students who had part-time faculty members as instructors.

This conclusion and the research on which it is based challenge the warnings and claims made by many spokespersons within higher education. W. Deegan, D. Tillery, A. Cohen and F. Brawer have warned of the possible slippage of academic excellence and teaching expertise with the increasing use of part-time faculty. In support of full-time faculty, the National Education Association, American Council on Education, American Association of University Professors, and many discipline-based associations have claimed that using and increasing part-time faculties has and will continue to affect student success negatively. These warnings and opinions appear to have no basis in research. This study and the one conducted by Stovall (1994) do not support such warnings and claims.

IMPLICATIONS

The first implication of this study is that part-time faculty members are as good as full-time faculty members in classroom teaching. Critics of this study may claim that

using developmental students does not address the dimension of "knowledge of one's unique subject." This criticism is a smoke screen. In using developmental students, this study has focused on teaching as it relates to student success. Developmental students offer a much more difficult audience to teach than the self-motivated, successful learners whom higher education refers to as "traditional college students."

The second implication is MCCC and other colleges can continue to employ, even increase the number of, part-time faculty members without negatively affecting student success. A part-time faculty is, therefore, an asset to the college which employs them.

RECOMMENDATIONS

The basis of all educational research is the improvement of student learning. This study gives important information on student learning as a function of the instruction delivered by full-time faculty and by part-time faculty. More research into the instructional impact of using part-time faculties and full-time faculties is needed.

This study provides colleges, such as MCCC, with a clear and easily followed methodology by which to assess student learning as a function of who is delivering the instruction in any academic course, collection of courses, or academic department. It is recommended that researchers at other colleges use the methodology developed for this study to conduct exploratory or verification studies at their institutions and to disseminate their results.

If there is no significant difference in classroom teaching between full-time faculty and part-time faculty, then the question "Why?" emerges. While this question stands outside the parameters of the current inferential research, the literature reviewed for this study offers at least one pathway to explore. That pathway is faculty development programs.

MCCC has given its part-time faculty members teaching effectiveness workshops and the opportunity to pursue development programs and activities which it offers to full-time faculty members. Other community colleges have taken the same course of action over the past decade. Now, baccalaureate colleges and universities are getting into

development programs and activities for their part-time faculties. It is possible that part-time faculty members are receiving the same teacher training as full-time faculty members. Perhaps, such development programs have produced equally qualified full-time faculty members and part-time faculty members. Studies on the results of professional development programs are needed.

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APPENDIX

Analysis of Pretest Scores

Table A: Pretest Scores for Experimental Group I
(Sample 1: Students Taught By Full-Time Faculty, S1n = 50)

Score	Score	Score	Score	Score
148	150	153	162	163
164	158	158	151	160
151	150	154	162	148
153	158	157	156	162
161	156	155	149	147
164	151	163	157	155
163	157	157	153	155
156	164	164	148	148
160	153	155	160	161
151	158	148	161	161

Table B: Pretest Scores for Experimental Group II
(Sample 2: Students Taught By Part-Time Faculty, S2n = 50)

Score	Score	Score	Score	Score
163	164	151	147	160
149	158	162	154	160
143	151	156	153	156
160	156	161	158	157
150	158	144	156	153
153	156	159	153	153
156	153	145	151	152
158	161	154	155	156
151	146	150	159	151
155	157	147	163	159

	Experimental Group I	Experimental Group II
Mean	156.1800	154.6600
Standard Deviation	5.236	5.097
Standard Error	0.740	0.721

An F-test of the data showed no significant difference in the variances of the two groups at a .05 level. The F-value was 1.06 with a two-tailed probability of 0.852.

Under the pooled variance estimate procedure for the t-test, the t-value was 1.47 at 98 degrees of freedom. The two-tailed probability was 0.145.

Under the separate variance estimate procedure for the t-test, the t-value was 1.47 at 97.93 degrees of freedom. The two-tailed probability was 0.145.

At a .05 level of significance, there is not enough evidence to reject the null hypothesis. There is no significant mean difference in pretest scores between the two independent samples.